CLAIMS

1. A discrete multitone (DMT) and orthogonal frequency division multiplex (OFDM) transceiver wherein communication occurs between stations in the form of symbols; the symbols being distributed and transmitted in channels which are allocated when making a link between the stations, each channel supporting a number of bits depending on the spectral response of the link when it is established; said system having a transmit mode where, according to the channel allocations, variable length sequences of bits are encoded and inverse fast Fourier transforms (iFFT's) are normally performed, and a receive mode, in which the received symbols are sampled and fast Fourier transforms (FFT's) are normally performed on the samples to produce a data sequence, said sequence being decoded into variable length sequences; characterised in that only a single FFT, or iFFT operates on real and imaginary parts of the data stream; the outputs of the FFT or iFFT being supplied to a post processing stage for solving simultaneous equations having real and imaginary terms, in order to derive parameters for separating the transmit and receive data.

2. A transceiver according to claim 1, wherein the FFT's are performed on the complex conjugate QAM pairs, and the FFT's are also performed on received QAM pairs.

3. A transceiver according to claim 2, wherein the output from the FFT's are of the form $y[x] = P+jQ$ and $y[N-x] = R+jS$, and including a stage of post processing which separates the transmit data, tx data[x], from the receive data, rxdata[x], on the basis of solving:

$$A = (Q+S)/2$$

$$B = (Q-S)/2$$

Where, rx data[x] = A+jB

tx data[x] = P-S and txdata[N-x] = R-Q

4. A method of discrete multitone (DMT) and orthogonal frequency division multiplex (OFDM) communication between stations, wherein symbols are distributed and transmitted in channels which are allocated when making a link between the stations, each channel supporting a number of bits depending on the spectral response of the link when it is established; the method having a transmit mode where, according to the channel allocations, variable length sequences of bits are encoded and inverse fast Fourier transforms (iFFT's) are normally performed, and a receive mode, in which the received symbols are sampled and fast Fourier transforms (FFT's) are normally performed on the samples to produce a data sequence, said sequence being decoded into variable length sequences; characterised by performing only a single FFT, or iFFT on real and imaginary parts of the data stream; and supplying the outputs of the FFT or iFFT to a post processing stage for solving simultaneous equations having real and imaginary terms, in order to derive parameters for separating the transmit and receive data.

5. A method according to claim 4, wherein the FFT's are performed on the complex conjugate QAM pairs, and the FFT's are also performed on received QAM pairs.

6. A method according to claim 5, wherein the output from the FFT's are of the form $y[x] = P+jQ$ and $y[N-x] = R+jS$, wherein the post processing separates the transmit data, tx data[x], from the receive data, rxdata[x], on the basis of solving:

$$A = (Q+S)/2$$

$$B = (Q-S)/2$$

Where, rx data[x] = A+jB

tx data[x] = P-S and txdata[N-x] = R-Q